

Synthesis of Polyarylene Alkyls. Communication 4.

62-58-4-16/32

Temperature Influence on the Course of the  
**Copolycondensation of Benzene and Chlorobenzene with**  
Dichloroethane

observed in the copolymerization of vinyl compounds. Then such copolymers form, the composition of which is subject to changes during polycondensation. Until now the process of common polymerization has not been investigated to such an extent that the reason for these changes of the forming copolymers could be explained. In the present paper the authors report on the carried out investigation of the influence of the reaction temperature on the course of the common polycondensation of 1,2-dichloroethane with benzene and chlorobenzene in the presence of aluminum chloride. It was shown that with increasing prolongation of the reaction also the content of chlorine in the polymer increases. From this is to be concluded that the activity of benzene and chlorobenzene in the interaction with chloroethane is different. Furthermore an equation was suggested which connects the yield in copolymers with the temperature and the duration of reaction.

There are 5 figures, 5 tables and 6 references, 2 of which are Soviet.

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Synthesis of Polyarylene Alkyls. Communication 4.  
Temperature Influence on the Course of the  
**Copolycondensation** of Benzene and Chlorobenzene with  
Dichloroethane

62-58-4-16/32

ASSOCIATION: Institut elementoorganicheskikh sovedineniy. Akademii  
nauk SSSR (Institute for **Elemental-organic** Compounds,  
AS USSR)

SUBMITTED: November 1, 1956

AVAILABLE: Library of Congress

1. Vinyl compounds--Copolymerization

Card 3/3

AUTHORS:

Kolesnikov, G. S., Korshak, V. V., Suprun, A. P.

62-58-5-11/27

TITLE:

Synthesis of the Polyarylenalkyles (Sintez poliarilenalkilov)  
Communication 5: The Influence of the Concentration of the  
Catalyst on the Course of Common Polycondensation of Benzene  
and Chlorobenzene With 1,2-Dichloroethane (Soobshcheniye 5.  
Vliyaniye kontsentratsii katalizatora na techeniye protsessa  
sovmestnoy polikondensatsii benzola i khlorbenzola s 1,2-dikhloro-  
etanom)  
Izvestiya Akademii Nauk SSSR, Otdeleniye Khimicheskikh Nauk,  
1958, Nr 5, pp. 600 - 604 (USSR)

PERIODICAL:

ABSTRACT:

In the preceding report the authors reported on the results  
of investigation of the influence of temperature of the reaction  
on the course of the process of common polycondensation of  
benzene and chlorobenzene with dichloroethane. Continuing the  
investigations in this field, the authors dealt in the present  
report with the influence of the concentration of the catalyst  
on the further course of polycondensation. The influence of  
the concentration of aluminumchloride on the course of common

Card 1/2

Synthesis of the Polyarylenalkyles. Communication 5: 62-58-5-11/27  
 The Influence of the Concentration of the Catalyst on the Course of Common  
 Polycondensation of Benzene and Chlorobenzene With 1,2-Dichloroethane

polycondensation of the 1,2-dichloroethane with benzene and chlorobenzene was investigated. It was found that the chlorine-content in the copolymer increases according to the prolongation of the reaction period. This confirms the already previously found heterogeneity of the relative activity of benzene and chlorobenzene in the interaction with dichloroethane. Further, the influence of the change of the reaction-temperature according to the change of concentration of the catalyst on the course of common polycondensation of dichloroethane was compared with that of benzene in the presence of aluminumchloride. There are 5 figures, 4 tables and 4 references, 3 of which are Soviet.

ASSOCIATION: Institut elementoorganicheskikh soyedineniy Akademii nauk SSSR  
 (Institute for Elemental-organic Compounds AS USSR)  
 SUBMITTED: November 1, 1956

Card 2/2  
 1. Cyclic compounds--Synthesis 2. Aluminum chlorides--Catalytic properties  
 3. Benzenes--Condensation reactions 4. Chlorobenzene--Condensation reactions  
 5. Dichloroethane--Condensation reactions

62-58-5-12/27

AUTHORS: Kolesnikov, G. S., Korshak, V. V., Suprun, A. P.

TITLE: Synthesis of the Polyarylenalkyles (Sintez poliarilenalkilov)  
Communication 6: Influence of the Correlation of Initial Components on the Course of Process of the Common Polycondensation of Benzene and Chlorobenzene With 1,2-Dichloroethane (Soobshcheniye 6. Vliyaniye sootnosheniya iskhodnykh komponentov na tekhnicheskuyu protsessu sovmestnoy polikondensatsii benzola i khlorobenzola s 1,2-dikhlorethanom)

PERIODICAL: Izvestiya Akademii Nauk SSSR, Otdeleniye Khimicheskikh Nauk, 1958, Nr 5, pp. 605 - 613 (USSR)

ABSTRACT: In previous works the influence of the reaction-temperature and of the concentration of the catalyst on the course of the common polycondensation of benzene and chlorobenzene with 1,2-dichloroethane in the presence of aluminumchloride was discussed (References 1,2). The investigation described in the present report, served for the purpose of determining the influence of the correlation of the components in the mixture of

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Synthesis of the Polyarylenalkyles. Communication 6: Influence of the Correlation of Initial Components on the Course of Process of the Common Polycondensation of Benzene and Chlorobenzene With 1,2-Dichloroethane

reactions- (in first place of the aromatic hydrocarbons). The applied method of performance was the same as that applied in the previous test. It results from tables 1 and 2 and from diagram 1 that with divided polycondensation of the benzene-dichloroethane-and chlorobenzene-dichloroethane-systems, the velocity of this process is substantially higher in the case of the polycondensation of chlorobenzene with dichloroethane. The coefficient of polymerization of the polycondensation-product of benzene with dichloroethane is higher than the coefficient of polymerization of the polymer (obtained from chlorobenzene and dichloroethane). The extent of the relative activity of chlorobenzene was determined (in which case the activity of benzene was assumed to be "1"). It was shown that the activity of these aromatic hydrocarbons does not depend on their concentration in the initial mixture. Moreover, an empiric equation was found which combines the structure

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62-58-5-12/27

Synthesis of the Polyarylenalkyles. Communication 6: Influence of the Correlation of Initial Components on the Course of Process of the Common Polycondensation of Benzene and Chlorobenzene With 1,2-Dichloroethane

of the copolymer (with its yield) with the correlation of the aromatic hydrocarbons in the initial mixture. An increase in the concentration of dichloroethane in the mixture of reaction causes a corresponding reduction of the yield of the copolymer. There are 5 figures, 10 tables and 5 references, 4 of which are Soviet.

ASSOCIATION: Institut elementoorganicheskikh soedineniy Akademii nauk SSSR (Institute for Elemental-organic Compounds AS USSR)

SUBMITTED: November 1, 1956

1. Cyclic compounds--Synthesis 2. Benzenes--Condensation reactions  
3. Chlorobenzene--Condensation reactions 4. Dichloroethane--Condensation reactions 5. Aluminum chloride catalysts--Applications

Card 3/3

AUTHORS:

Korshak, V. V., Kolesnikov, G. S., Zhubanov, B. A.

62-58-5-14/27

TITLE:

Phosphor-Organic Polymers (Fosfororganicheskiye polimery)  
Communication 3: Polycondensation of p-Chlorophenyldichloro-  
phosphines With 1,2-Diphenylethane (Soobshcheniye 3. Poli-  
kondensatsiya p-khlorfenildikhlorfosfina s 1,2-difeniletanom)

PERIODICAL:

Izvestiya Akademii Nauk SSSR, Otdeleniye Khimicheskikh Nauk,  
1958, Nr 5, pp. 618 - 625 (USSR)

ABSTRACT:

The phosphorous highly-molecular compounds in which phosphorus inserts in the basic-chain of the polymer and in which phosphorus is immediately combined with the hydrocarbon-atoms, have been very little investigated up till now. In the respective publication only the products of copolymerization of unsaturated compounds with dichlorophosphines in which the main chain consists of carbon atoms and phosphorus atoms, are given. A series of experiments in which the molar correlation of the initial substances was 1:1, was carried out for the purpose of clearing the influence of the concentration of the catalyst on the

Card 1/2



**Phosphor-Organic Polymers. Communication 3: Poly- 62-58-5-14/27**  
**condensation of p- Chlorophenyldichlorophosphines With 1,2-Diphenylethane**

process of polycondensation of p-chlorophenyldichlorophosphine with diphenylethane. The essential rules governing the polycondensation process were determined with the investigation of the polycondensation of the p-chlorophenyldichlorophosphine with 1,2-diphenylethane in the presence of aluminum chloride. The substitution of a hydrogen-atom in benzene by a phosphorous radical with simultaneous formation of a phosphorus-carbon bond leads to the deactivation of the remaining hydrogen-atoms in the benzene-ring. It was found that the polycondensation of p-chlorophenyldichlorophosphine with diphenylethane is complicated by processes which take place according to the way of reaction of superarylation. There are 5 tables and 16 references, 13 of which are Soviet.

ASSOCIATION: Institut elementoorganicheskikh soedineniy Akademii nauk SSSR  
 (Institute for Elemental-organic Compounds AS USSR)

SUBMITTED: November 12, 1956

Card 2/2

1. Phosphorous compounds (Organic)--Analysis
2. Diphenylethane
- Condensation reactions
3. Phosphines--Condensation reactions
4. Aluminum chloride catalysts--Applications

AUTHORS:

Kolesnikov, G. S., Soboleva, T. A.

SOV/62-58-6-17/37

TITLE:

Carbochain Polymers and Copolymers (Karbotshepnnyye polimery i sopolimery) Communication 4. Synthesis and Polymerization of the Methyl Ether of 4-Vinyl Benzoic Acid (Soobshcheniye 4. Sintez i polimerizatsiya metilovogo efira 4-vinilbenzoynoy kisloty)

PERIODICAL:

Izvestiya Akademii nauk SSSR, Otdeleniye khimicheskikh nauk, 1958, Nr 6, pp. 760 - 762 (USSR)

ABSTRACT:

The present paper is a continuation of investigations carried out in the field of the synthesis and polymerization of styrol derivatives which contain substituents in the aromatic core. This paper aims at bringing about the synthetization of methyl-4-vinylbenzoates, and in this connection the influence exercised by the introduction of the ester group into the styrol molecule upon the vitrification temperature of the polymer was to be explained. The synthesis of methyl-4-dibromobenzoate was carried out according to the scheme: 1,4-dibromobenzol-(4-bromophenyl)-methylcarbinol-(4-phenol cyanide)-methylcarbinol-4-vinylbenzoate. The polymer and the co-polymer (of the synthetized

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Carbochain Polymers and Copolymers. Communication 4. SOV/62-58-6-17/37  
Synthesis and Polymerization of the Methyl Ether of 4-Vinyl Benzoic Acid

ester) was obtained with methylmetacrylate, and the vitrification temperatures of the polymer and co-polymer were determined. There are 3 references, 2 of which are Soviet.

ASSOCIATION: Institut elementoorganicheskikh soedineniy Akademii nauk SSSR  
(Institute of Elemental-organic Compounds AS USSR)

SUBMITTED: December 7, 1956

1. Methyl ethers--Synthesis
2. Methyl ethers--Polymerization
3. Acrylic resins--Applications

Card 2/2

AUTHORS: Kolesnikov, G. S., Korshak, V. V., 62-58-6-18/37  
Suprun, A. P.

TITLE: The Synthesis of Polyarylalloys (Sintez poliarilenalkilov)  
Communication 7. Joint Polycondensation of the Systems Dichloro-  
ethane-Benzene-Fluorobenzene and Dichloroethane-Chlorobenzene-  
-Fluorobenzene (Soobshcheniye 7. Sovmestnaya polikondensatsiya  
sistem dikhlroetan-benzol-ftorbenzol i dikhlroetan-khlorbenzol-  
-ftorbenzol)

PERIODICAL: Izvestiya Akademii nauk SSSR, Otdeleniye khimicheskikh nauk,  
1958, Nr 6, pp. 763 - 766 (USSR)

ABSTRACT: In the preceding papers the authors spoke about the results of  
the investigation of the joint polycondensation of dichloroethane  
with benzene and chlorobenzene. For the purpose of explaining  
the behavior of other halide-substituted aromatic hydrocarbons in  
the case of joint polycondensation with dichloroethane and  
benzene the authors investigated the polycondensation of the  
systems dichloroethane-benzene-fluorobenzene and dichloroethane-  
-chlorobenzene-fluorobenzene in the presence of aluminum chlo-  
ride. The relative activity of the fluorobenzene is much lower

Card 1/2

The Synthesis of Polyaryllalkyls. Communication 7. SOV/62-58-6-18/37  
Joint Polycondensation of the Systems Dichloroethane-Benzene-Fluorobenzene  
and Dichloroethane-Chlorobenzene-Fluorobenzene

than that of chlorobenzene. The polycondensation of fluoro-  
benzene with dichloroethane was carried out for the first time  
by two of the authors of this paper and Fedorova (Ref 4). There  
are 3 figures, 3 tables, and 4 Soviet references.

ASSOCIATION:

Institut elementoorganicheskikh soedineniy Akademii nauk SSSR  
(Institute of Elemental-organic Compounds AS USSR)

SUBMITTED:

November 12, 1956

1. Benzene-ethyl chloride systems---Chemical reactions
2. Condensation reactions
3. Aluminum chloride---Chemical effects

Card 2/2

AUTHORS: Kolesnikov, G. S., Korshak, V. V., Smirnova, T. V. SOV/62-58-6-19/37

TITLE: The Synthesis of Polyarylene Alkyls (Sintez poliarilenalkilov) Communication 8. The Transarylation of Diphenyl Methane (Soobshoheniye 8. Perearilirovaniye difenilmetana)

PERIODICAL: Izvestiya Akademii nauk SSSR, Otdeleniye khimicheskikh nauk, 1958, Nr 6, pp. 767-770 (USSR)

ABSTRACT: Two of the authors of the present paper have already described (Refs 1,2) the investigation of the reaction of the transarylation of 1,2-diphenyl ethane in the presence of aluminum chloride, on which occasion they solved the problem of the influence exercised by the temperature of the reaction and concentration of the catalyst upon the development of the process. In the course of the present paper they describe the investigation of the transarylation of diphenyl methane in the presence of aluminum chloride at various temperatures and concentrations of the catalyst. For this purpose the authors carried out a number of experiments during which the concentration of the catalyst and the duration of the reaction remained constant. The results obtained are shown by table 5.

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The Synthesis of Polyarylene Alkyls. Communication  
8. The Transarylation of Diphenyl Methane

SOV/62-58-6-19/37

In-so-far as the reaction of the transarylation of diphenyl methane is a catalytic process, transarylation experiments are carried out (at 90°) for the duration of the reaction at different concentrations for the purpose of determining the influence exercised by the concentration of the catalyst. The results obtained by these experiments are shown by tables 2, 6 and 7. In conclusion, the authors assume that the mechanism of the transarylation of diphenyl methane is similar to that of the transarylation of 1,2-diphenyl ethane. A difference exists solely with respect to the possibility of the formation of dihydroanthracene cycles at the end of the growing chain (as well as in the middle of the chain). There are 7 tables and 6 references, 5 of which are Soviet.

ASSOCIATION: Institut elementoorganicheskikh soyedineniy Akademii nauk SSSR  
(Institute of Elemental-organic Compounds AS USSR)

SUBMITTED: November 20, 1956

Card 2/3

The Synthesis of Polyarylene Alkyls.

SOV/62-58-6-19/37

Communication 8. The Transarylation of Diphenyl Methane

1. Diphenyl methane--Synthesis 2. Aluminum chloride catalysts--Performance

Card 3/3

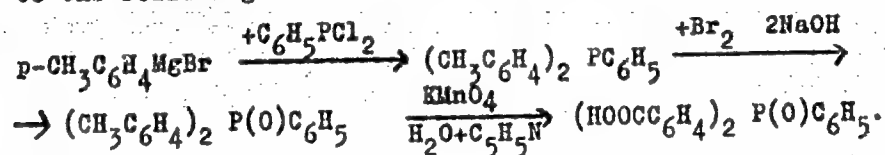


AUTHORS: Frunze, T. M., Korshak, V. V., SOV/62-58-6-26/37  
 Kurashev, V.V., Kolesnikov, G. S., Zhubanov, B. A.

TITLE: On Some Phosphorus-Containing Polyamides (O nekotorykh fosforsoderzhashchikh poliamidakh)

PERIODICAL: Izvestiya Akademii nauk SSSR, Otdeleniye khimicheskikh nauk, 1958, Nr 6, pp. 783 - 785 (USSR)

ABSTRACT: In order to explain the influence exercised by the phosphorus atom upon the properties of polyamides a number of polymers was obtained by the polycondensation of bis-(p-carboxyphenyl) phenylphosphin oxides with various aliphatic and aromatic diamines. The initial acid was obtained by the authors according to the following scheme:



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Polycondensation took place under the usual conditions (Ref 1).  
 From the results mentioned (Tables 1,2) it may be seen that

On Some Phosphorus-Containing Polyamides

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with the lengthening of the carbon chain of diamine from tetramethylene to decamethylene diamine softening-temperatures are reduced. At the same time, fluctuation becomes weaker. There are 2 tables and 6 references, 4 of which are Soviet.

ASSOCIATION: Institut elementorganicheskikh soyedineniy Akademii nauk SSSR  
(Institute of Elemental-organic Compounds AS USSR)

SUBMITTED: January 27, 1958

1. Amides---Chemical properties
2. Phosphorus---Chemical effects
3. Condensation reactions

Card 2/2

AUTHORS: Kolesnikov, G. S., Fedorova, L. S., SOV/62-58-7-15/26  
Tsetlin, B. L., Klimentova, N. V.

TITLE: Carbon Chain Polymers and Copolymers (Karbotsepnyye polimery i sopolimery) Communication 5. The Synthesis and the Properties of the Copolymers of Acrylonitril and Methyl Methacrylate (Soobshcheniye 5. Sintez i svoystva sopolimerov akrilonitrila i metilmetakrilata)

PERIODICAL: Izvestiya Akademii nauk SSSR, Otdeleniye khimicheskikh nauk, 1958, Nr 7, pp. 886 - 890 (USSR)

ABSTRACT: The present paper deals with the explanation of the influence of the correlation of the monomers (in the initial mixture) on the composition (structure) of the copolymer at a relatively high rate of reaction. The authors further deal with the investigation of the dependence of some properties of the copolymers on their structure. The authors produced acrylonitrile and methyl methacrylate copolymers by means of an emulsion at a high rate of reaction. Furthermore the structure of these copolymers was determined. It was found that minimum values of the characteristic viscosity of the copolymers on the one hand, and of the temperatures of the passage into highly elastic and more liquid

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Carbon Chain Polymers and Copolymers. Communication 5: SOV/62-58-7-15/26  
The Synthesis and the Properties of the Copolymers of Acrylonitrile and Methyl  
Methacrylate

state on the other hand correspond to copolymers of different structure. It was also found that methyl methacrylate copolymers with acrylonitrile (up to 30 molar % of acrylonitrile) approach poly methyl methacrylate very closely as regards its stability. There are 3 figures, 2 tables, and 11 references, 2 of which are Soviet.

ASSOCIATION: Institut elementoorganicheskikh soedineniy Akademii nauk SSSR  
(Institute of Elemental-organic Compounds, AS USSR)

SUBMITTED: December 30, 1956

Card 2/2

AUTHORS:

Kolesnikov, G. S., Federova, L. S.

SOV/62-58-7-23/26

TITLE:

On the Polymerization Mechanism of Acrylonitrile in the Presence of Boron Tributyl (O mekhanizme polimerizatsii akrilonitrila v prisutstvii tributilbora)

PERIODICAL:

Izvestiya Akademii nauk SSSR, Otdeleniye khimicheskikh nauk, 1958, Nr 7, p. 906 (USSR)

ABSTRACT:

Boron alkyls are a new type of catalysts in the polymerization of unsaturated compounds (Refs 1-5). The more accurate determination of the catalytic efficiency of the boron alkyls is of special interest. The authors of the present article found in the investigation of the process of the emulsion polymerization of acrylonitrile in the presence of boron tributyl that in the case of an absence of oxygen no polymerization of acrylonitrile takes place (at 20 and 50°). However, the polymerization using acrylonitrile or water (without oxygen extraction) proceeds easily. The polymerization also takes place easily if no air is displaced from the ampoule by means of nitrogen. The poly-acrylo nitrile yield reaches 60%. The release of the acrylonitrile polymerization by means of boron tributyl includes the intermediate stage (the formation

Card 1/2

On the Polymerization Mechanism of Acrylonitrile in the Presence of Boron  
Tributyl

SOV/62-58-7-23/26

of products of the interaction of boron tributyl with oxygen). The already earlier observed small yield of poly-acrylonitrile in the polymerization of acrylonitrile (in the presence of boron tributyl in toluene) can be explained by the fact that the polymerization was carried out in the nitrogen atmosphere free from oxygen. The monomer and the solvent were distilled prior to the polymerization; this effected the removal of the greatest part of the oxygen dissolved in them. There are 6 references, 4 of which are Soviet.

ASSOCIATION: Institut elementoorganicheskikh sovedineniy Akademii nauk SSSR  
(Institute of Elemental-organic Compounds, AS USSR)

SUBMITTED: April 29, 1958

Card 2/2

AUTHORS:

Kolesnikov, G. S., Yermolayeva, T. I.

S07/62-58-8-19/22

TITLE:

Letters to the Editor (Pis'ma redaktoru)  
Difluorine Anhydride of n-Butylboric Acid, a Polymerization  
Catalyst (Diftorangidrid n.butilbornoy kisloty - katalizator  
polimerizatsii)

PERIODICAL:

Izvestiya Akademii nauk SSSR, Otdeleniye khimicheskikh nauk,  
1958, Nr 8, pp. 1015-1015 (USSR)

ABSTRACT:

In the previous paper the authors together with Fedorova (Ref 1) showed that the addition of fluorine boron ester to tributyl boron considerably increases the catalytic activity of tributyl boron in the polymerization of acrylonitrile. This increase of the catalytic activity may be assumed to be a consequence of the formation of the fluorine anhydride of dibutylboric acid and of the difluorine anhydride of butylboric acid (as final result of the interaction between boron fluoride and boron tributyl). Either both fluorine anhydrides or one of them occurs as catalysts in the polymerization. In order to check this assumption the authors synthesized the difluorine anhydride of butylboric acid (Ref 2) and polymerized acrylonitrile in xylene in the presence of this compound. It was found that on

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Letters to the Editor. Difluorine Anhydrides of n-Butylboric Acid, a Polymerization Catalyst

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the same conditions the yield of polyacrylonitril amounts to 31,2% when using difluorine anhydride of butylboric acid. In the presence of boron tributyl, however, it amounts to only 5,3%. Thus, it was found that the difluorine anhydride of butylboric acid is the polymerization catalyst of methylmethacrylate and styrene. The experimental proof was supplied that the difluorine anhydride of n-butylboric acid occurs as catalyst of the polymerization of unsaturated compounds. There are 2 references, 1 of which is Soviet.

ASSOCIATION: Institut elementoorganicheskikh soedineniy Akademii nauk SSSR  
(Institute of Elemental-Organic Compounds AS USSR)

SUBMITTED: April 24, 1958

Card 2



AUTHORS: ~~Kolesnikov, G. S.~~ Korshak, V. V.,  
Smirnova, T. V.

SOV/62-58-9-17/26

TITLE: Synthesis of the Polyarylene Alkyls (Sintez poliarilenalkilov)  
Communication 9: Synthesis and Aryl Group Interchange in  
Monofluoro and Monochlorodiphenylmethane (Soobshcheniye 9.  
Sintez i perearilirovaniye monoflor- i monokhlordifenil-  
metanov)

PERIODICAL: Izvestiya Akademii nauk SSSR. Otdeleniye khimicheskikh nauk,  
1958, Nr 9. pp 1123 - 1126 (USSR)

ABSTRACT: The authors attempted to determine whether only the  
non-substituted diaryl alkanes but also their derivatives  
undergo aryl group interchange reactions. For these in-  
vestigations they synthesized the monohalogen derivative  
of diphenylmethane, as well as the meta- and para-chloro  
and meta- and para-fluoro derivatives of diphenylmethane.  
It was shown that aryl groups in these compounds can be  
replaced by other aryl groups by warming in the presence  
of aluminum chloride. m-chloro, m-fluoro, and p-fluoro-  
diphenylmethanes were synthesized for the first time.  
It was found that the presence of a halogen atom weakens

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Synthesis of the Polyarylene Alkyls. Communication 9: SOV/62-58-9-17/26  
Synthesis and Aryl Group Interchange in Monofluoro and Monochlorodiphenyl-  
methane

the bond between the methylene group and the substituted aromatic nucleus. Halogen atoms which are meta to the methylene group exert no effect on the stability of this bond. There are 2 tables and 7 references, 6 of which are Soviet.

ASSOCIATION: Institut elementoorganicheskikh soedineniy Akademii nauk SSSR  
(Institute of Elemental-organic Compounds, AS USSR)

SUBMITTED: February 14, 1957

Card 2/2

5(3)

AUTHORS:

Kolesnikov, G.S., Klimentova, N.V.

SOV/62-58-11-18/26

TITLE:

Carbon Chain Polymers and Copolymers (Karbonsepnnyye polimery i sopolimery)  
Communication 5. Copolymerization of Acrylonitrile and Methyl Methacrylate in the Presence of Tributyl Boron (Soobshcheniye 5. Sopolimerizatsiya akrilonitrila i metilmetakrilata v prisutstvi tributilbora)

PERIODICAL:

Izvestiya Akademii nauk SSSR. Otdeleniye khimicheskikh nauk, 1958, Nr 11, pp 1383 - 1387 (USSR)

ABSTRACT:

By provisional experiments the authors have ascertained that methyl methacrylate is polymerized by activated borofluoride etherate if its solution in toluene with tributyl boron is heated. At the same time the polymerization of methyl methacrylate also takes place, if the activator is not present, but in the presence of tributyl boron. The first series of experiments was carried out for the purpose of ascertaining the influence of the concentration of catalyst and activator on the composition, yield and properties of the copolymer. Results are given (Table 1). It has been ascertained that for the production of a copolymer of maximum molecular weight a concentration of the catalyst of the

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Carbon Chain Polymers and Copolymers. Communication 5.  
Copolymerization of Acrylonitrile and Methyl Methacrylate  
in the Presence of Tributyl Boron

SOV/62-58-11-18/26

order of 2 - 3 molecular % of the sum of monomers must be used. It can be seen (Table 2) that the concentration of the activator has practically no influence on the composition of the polymer and on the yield. In order to explain the influence of temperature on the process of copolymerization a further series of experiments has been carried out (Table 3). It can be seen that the yield of copolymers remains practically constant at temperatures of 30° and above. At 30-40° the characteristic viscosity reaches its maximum. In the following series of experiments (Table 4) the influence of the time of reaction on the copolymerization was investigated. It can be gathered from this table that a prolongation of the time of reaction from 0,5 to 2 hours results in a noticeable increase of the yield. A longer time of reaction exerts smaller influence. The characteristic viscosity increases, if the time of reaction is extended up to 3 hours. It has been tried to ascertain the influence of the relations of monomers on the copolymerization. For this purpose a further series of experiments was carried out, the results of which are given (Table 5). It was ascertained that the content of acrylonitrile in the copolymer

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Carbon Chain Polymers and Copolymers. Communication 5.  
Copolymerization of Acrylonitrile and Methyl Methacrylate  
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in all cases was smaller than in the initial mixture of monomers. The summary concentration of monomers in the reaction mixture is not unimportant for the copolymerization process. An intensified concentration of monomers leads to an increase in the yield of copolymers and to an increase of the characteristic viscosity, if all other conditions remain the same. There are 5 tables and 2 references, 1 of which is Soviet.

ASSOCIATION: Institut elementoorganicheskikh sovedineniy Akademii nauk SSSR  
(Institute of ~~Elementalorganic~~ Compounds of the Academy of Sciences,  
USSR)

SUBMITTED: March 21, 1957

Card 3/3

KOLESHNIKOV, G.S.; AVETIAN, H.G.

Synthesis, polymerization and copolymerization of 1,1-dichloro-2-fluoroethylene, 1-chloro-2-fluoroethylene, 1,1-dibromo-2-fluoroethylene and 1-bromo-2-fluoroethylene. Izv. AN Arm.SSR. Khim.nauki 11 no.3:201-209 '58.

1. Institut elementoorganicheskikh soedineniy AN SSSR i Institut organicheskoy khimii AN ArmSSR,  
(Ethylene)

Kolesnikov, G. S.

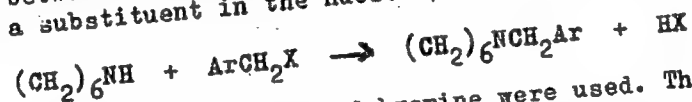
79-2-52/64

AUTHORS: Kolesnikov, G. S., Shcherbo, L. I.

TITLE: Hexamethylene Imine - Derivatives (Proizvodnyye  
geksametilenimina).  
III. Substituted N-Benzyl-Hexamethylene-Imines  
(III. Zameshchennyye N-benzilgeksametileniminy).

PERIODICAL: Zhurnal Obshchey Khimii, 1958, Vol. 28, Nr 2,  
pp. 519-520 (USSR)

ABSTRACT: Continuing the hitherto carried out investigations the  
compounds quoted in the title were obtained from the reaction  
between hexamethylene imine and benzyl halides (containing  
a substituent in the nucleus) according to the scheme:



Fluorine, chlorine, and bromine were used. The methods of  
syntheses were the same as in the preceding works. The  
derivatives obtained were characterized by their picrates  
and are given on a table. N-o- and p-fluoro benzyhexamethylene  
imine, N-benzylhexamethylene imine, N-o-, -m-, and -p- chloro  
benzyl hexamethylene imine as well as N-p-bromo benzyl  
hexamethylene imine were obtained. Six of the mentioned

Card 1/2

Hexamethylene Imine - Derivatives.

79-2-52/64

III. Substituted N-Benzyl-Hexamethylene-Imines

compounds are described for the first time. The method of preparation and specific data are given. There are 1 table, and 2 references, 2 of which are Slavic.

ASSOCIATION: Moscow Chemical and Technological Institute  
(Moskovskiy khimiko-tekhnologicheskii institut).

SUBMITTED: February 13, 1957

AVAILABLE: Library of Congress

Card 2/2



KOLESNIKOV, I., general-mayor med. sluzhby, Prof.; SHILOV, P., polkovnik  
med. sluzhby, prof.; Pilyushin, P., mayor med. sluzhby

Relation of therapeutic diet to functional disorders of the stomach  
in thermal burns. Voen.-med. zhur. no.10:171-77 O '57 (MIRA 12:7)

(DIETS, in var. dis.

burns, relation to stomach funct. (Rus))

(BURNS, therapy,

diets, relation to stomach funct. (Rus))

(STOMACH, in var. dis.

burns, relation to diet ther. (Rus))

KOLESNIKOV, I.

Farm Buildings

Let's fulfill the yearly plan in advance. Sel.' stroi. No. 3(44), 1952

9. Monthly List of Russian Accessions, Library of Congress, August 195~~8~~<sub>2</sub>, Uncl.

RODIONOV, M.; KOLESHNIKOV, I., red.; GRIGOR'YEVA, Ye., tekhn.red.

[Forty-nine days; a collection] 49 dni; sbornik. Moskva,  
Izd-vo TsK VLSM "Molodnaya gvardiya," 1960. 250 p.

(MIRA 14:3)

(Survival (after airplane accidents, shipwrecks, etc.))

BOGACHUK, Anatoliy Innokent'yevich; KOLESNIKOV, I., red.; MIKHAYLOVSKAYA, N.,  
tekhn. red.

[We are optimists] My - optimisty. Moskva, Izd-vo TsK VLKSM  
"Molodaia gvardiia," 1961. 142 p. (MIRA 15:3)  
(Irkutsk Province—Aluminum industry)

KOLESNIKOV, I., inzh.

Substitution of removable partitions for levees of rice plots. Gidr. i mel. 15 no.7:35-37 J1 '63. (MIRA 16:8)

1. Vsesoyuznoye ob'yedineniye Soveta Ministrov SSSR po prodazhe sel'skokhozyaystvennoy tekhniki, zapasnykh chastey, mineral'nykh udobreniy i drugikh material'no-tekhnicheskikh sredstv, organizatsii remonta i ispol'zovaniya mashin v kolkhozakh i sovkhozakh.

KOLESHIKOV, I.A.; RADOMSKIY, M.M.

Reconstruction of the Sambor Sugar Factory. Sakh. prom. 35  
no. 1:12-14 Ja '61. (MIRA 14:1)

1. Samborskly sakharnyy zavod.  
(Sambor--sugar industry)

KOLESNIKOV, I. D.

Conducting an excursion to a rural hydroelectric power station.  
Fiz. v shkole 22 no.4:91 J1-Ag '62. (MIRA 15:10)

1. 26-ya sergiyevskaya srednyaya shkola Giaginskogo rayona  
Krasnodarskogo kraya.

(School excursions)  
(Hydroelectric power stations)

LITVINENKO, V. I.; MAKSYUTINA, N. P.; KOLESNIKOV, I. G.

Flavonoid compounds of *Glycyrrhiza glabra* L. Zhur. ob. khim.  
33 no.1:296-299 '63. (MIRA 16:1)

1. Khar'kovskiy nauchno-issledovatel'skiy khimiko-farmatsé-  
ticheskiy institut.

(Flavonoids)



KOLESNIKOV, I.I.

Computing coordinates of ground control points determined by  
resection. Geod.1 kart. no.2:34-35 F '57. (MLBA 10:5)  
(Surveying)

KOLESHNIKOV, I.I., dotsent, kandidat biologicheskikh nauk.

Rodents of southern Kysyl-Kum and data on their economic role in  
desert meadows. Biul. SAQU no.28:129-154 '49. (MLRA 9:5)  
(Kysyl-Kum--Rodentia)

KOLESNIKOV, I.I.

Occurrence of the brown rat in Tashkent. Trudy SAGU no. 32:3-12  
'52. (MLBA 9:5)

(Tashkent--Rats)

KOLESHNIKOV, I.I.

Vertebrates of the southern Ust-Urt and their economic significance.  
Trudy SAGU no.32:13-26 '52.  
(Ust-Urt--Zoology, Economic) (MLRA 9:5)

VULFSON, B.I. (Engineer), GERASIMOV, V.N.  
KOLESNIKOV, I.L.

Electric Power Plants

Heating and electric power units with a flue gas temperature of 100° C. Za ekon. top. 9  
No. 5 (1952)

Monthly List of Russian Accessions, Library of Congress, August, 1952. UNCLASSIFIED.

12657

S/832/62/000/000/015/015.  
D424/D307

5.3700

AUTHORS:

Kolenikov, I.M., Gundyrev, A.A., Nametkin,  
N.S., Panchenkov, G.M. and Topchiyev, A.V.

TITLE:

Behavior of some organosilicon compounds in  
the region of the solidification temperature

SOURCE:

Issledovaniya v oblasti kremniyorganiches-  
kikh soyedineniy; sintez i fiziko-khimicheskiye  
svoystva. Sbornik statey. Inst. neftekhim. sint.  
AN SSSR. Moscow, Izd-vo AN SSSR, 1962, 243-253

TEXT:

The solidification behavior of 31 organosilicon  
compounds has been investigated in order to determine their true  
melting points and purity, and the conditions under which glasses  
are formed. The compounds were of the following types: hexaalkyl  
derivatives of disilylmethane, -ethane, and -propane, and of  
disiloxane, phenyl-, 4-methylphenyl-, and 3, 4-dimethylphenyl-  
trialkylsilanes, diphenyl-, bis-4-methylphenyl-, and bis-3,4-  
-dimethylphenyldialkylsilanes, linear and cyclic polyethylsiloxanes.

Card 1/3

Behavior of some ...

S/832/62/000/000/015/015  
D424/D307

dialkylsilanes, and an arylalkylsilane. The main feature of the apparatus used is that the sample was contained in a double-walled glass vessel immersed in liquid nitrogen, the rate of cooling being controlled by the degree of evacuation of the space between the walls. Many of the compounds underwent pronounced supercooling and others did not crystallize but formed glasses. Where a glass was not formed, the m.p. of the material as such and the true m.p. of its main constituent were determined graphically by Rossini's method (J. Res. Nat. Bureau Standards, 32, 197 (1944)). In the series of phenyltrialkylsilanes, the methyl and propyl compounds supercool only slightly and then crystallize spontaneously, while the ethyl compound crystallizes only after the deeply supercooled liquid is seeded, and the butyl compound forms a glass. Somewhat similar behavior is found with other series of compounds, the following also forming glasses on cooling: 3,4-dimethylphenyltripropyl- and -tributylsilanes, diphenyldiethyl- and -dibutylsilanes, bis-4-methylphenyldimethyl- and -dipropylsilanes, bis-3,4-dimethyldiethylsilane, hexapropyldisilylmethane and -ethane, and the polyethylsiloxanes containing 5, 6, 7 and 8 oxygen atoms. The viscosities

Card 2/3

KOLESNIKOV, I.M.; PANCHENKOV, G.M.

Kinetics of the reaction of benzene alkylation with propylene in the gas phase in the presence of a catalyst applied as a film to the inert carrier. Trudy MINKHIMP no.37:85-93 '62.

Method for calculating the rates of chemical reactions in nonisothermal flow. Ibid.:93-103  
(MIRA 17:3)



KOLESNIKOV, I.M.

Kinetics of bimolecular irreversible heterogenous reaction of  
ethylene hydrogenation carried out in a flow through system.  
Izv.vys.ucheb.zav.; nef't' i gaz 1 no.11:77-83 '58.

(MIRA 12:5)

1. Moskovskiy institut neftekhimicheskoy i gazovoy promy-  
shlennosti in. akad. I.M. Gubkina.  
(Ethylene) (Hydrogenation)

KOLESNIKOV, I.M., Cand Chem Sci — (diss) "Kinetics of the  
reaction of alkylation of benzene <sup>by</sup> with propylene, isopropyl  
alcohol, and methyl chloride <sup>on</sup> ~~in~~ al<sup>u</sup>mosilicate cataly<sup>z</sup>ers."

Mos, 1959, 12 pp (Min of Higher Education USSR. Mos Inst  
of Petroleum ~~chemistry~~ <sup>C</sup> Chemical and Gas Industry in  
I.M. Gubkin. Chem Technological Faculty. Chair of Physics  
and Colloidal Chemistry) 160 copies (KL, 34-59, 111)

- 17 -

5(3)

AUTHORS:

Panchenkov, G. M., Kolesnikov, I. M.

SOV/152-59-3-20/25

TITLE:

On the Kinetics of Dehydrogenation of Boundary Hydrocarbons  
(O kinetike degidrogenizatsii predel'nykh uglevodorodov)

PERIODICAL:

Izvestiya vysshikh uchebnykh zavedeniy. Neft' i gaz, 1959,  
Nr 3, pp 91-95 (USSR)

ABSTRACT:

The first author gave a general method for the calculation of the velocity of continuously proceeding chemical reactions and physico-chemical processes for both static and not static systems (Refs 1, 2, 3, 4). The present paper shows the possibility of using the kinetic equation set up (Refs 3, 4) for the utilization of the dehydrogenation of n-butane in the presence of a chromium-aluminum-catalyst. The experimental data required for this purpose were taken from a paper by G. D. Lyubarskiy (Ref 5). Dehydrogenation was carried out continuously under dilution with additions of varying amounts of nitrogen. It is stated that the kinetic equation is applicable to considerable and inconsiderable dilutions and low and high reaction rates of limit hydrocarbons. The utilization of experimental data shows that the kinetics of dehydrogenation of n-butane by a chromium-aluminum-catalyst is well explained.

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On the Kinetics of Dehydrogenation of Boundary Hydrocarbons

SOV/152-59-3-20/25

by the equation:  $-x - \frac{1 + \beta}{\beta} \ln(1 - x) = \frac{k_1}{n_0}$ , where:  
 $x$  = reaction quantity,

$$\beta = \frac{\gamma - b_A p + b_B p + b_C p}{1 + b_A p + \gamma(1 + b_p p)} \quad (\gamma = \text{stoichiometric coefficient,}$$

$b_A, b_B, b_C, b_p$  are the adsorption coefficients of the limit hydrocarbon, the unsaturated hydrocarbon, the hydrogen and the inert dilution gas;

$\gamma = \frac{n_p}{n_0}$ , the ratio between the number of the gram moles of the dilution gas ( $n_p$ ) and the number of gram moles of the saturated hydrocarbon);

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$$k_1 = \frac{k_1}{\beta} \left( k = \frac{k' S_0 b_A p}{1 + b_A p + \gamma(1 + b_p p)} \right) \quad k' = \text{constant of the reaction}$$

On the Kinetics of Dehydrogenation of Boundary Hydrocarbons

SOV/152-59-3-20/25

velocity,  $S_0$  = surface of the catalyst with respect to the unit of length of the layer in the direction of flow,  $l$  = length of the reactor). In a diagram with the abscissa  $-2.3 \lg(1-x)$  and the ordinate  $n_0 x$  the values lie on a straight line. In the case of increasing dilution of the n-butane by nitrogen the angle of inclination of the straight line to the abscissa becomes steeper. The apparent activation energy is calculated according to the equation by Arrhenius to amount to  $38000 \text{ cal/mol} \pm 500$ . There are 3 figures, 1 table, and 5 Soviet references.

ASSOCIATION: Moskovskiy institut neftekhimicheskoy i gazovoy promyshlennosti im. akad. I. M. Gubkina (Moscow Institute of Petroleum Chemical and Gas Industry imen. akad. I. M. Gubkin)

SUBMITTED: November 30, 1958

Card 3/3

Kinetics of coke formation on an aluminosilicate catalyst in the alkylation of benzene by propylene. Izv. vys. ucheb. zav.; neft' i gaz 2 no. 9:79-80 '59. (MIRA 13:2)

1. Moskovskiy institut neftekhimicheskoy i gazovoy promyshlennosti imeni akademika I. M. Gubkina.  
(Coke) (Aluminum silicates) (Alkylation)

PANCHENKOV, G.M.; KOLESNIKOV, I.M.

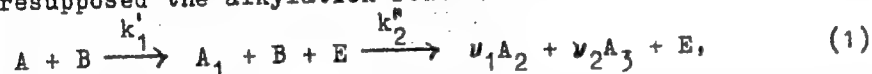
Kinetics of the formation of isopropylbenzene and diisopropylbenzene from benzene and propene on aluminosilicate catalyst. Izv. vys. ucheb. zav.; neft' i gaz 2 no.5:55-62 '59. (MIRA 12:8)

L.Moskovskiy institut neftekhimicheskoy o gazovoy promyshlennosti im. akademika I.M. Gubkina.  
(Alkylation) (Benzene)

S/152/60/000/003/001/003  
B023/B060

AUTHORS: Panchenkov, G. M., Kolesnikov, I. M.  
TITLE: Reaction Kinetics of the Alkylation of Benzene With Methyl Chloride on an Alumosilicate Catalyst  
PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy. Neft' i gaz, 1960, No. 3, pp. 59-62

TEXT: The authors wanted to study the applicability of kinetic equations set up for bimolecular, irreversible, heterogeneous, multiple-series reactions, for the purpose of interpreting experimental data concerning the alkylation of benzene with methyl chloride on an alumosilicate catalyst. The purpose of the alkylation reaction was the production of toluene. Basing on kinetic data of an earlier paper (Ref. 2) the authors presupposed the alkylation reaction to have the following course:



where A - benzene, B - methyl chloride, E - hydrogen chloride,

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Reaction Kinetics of the Alkylation of  
Benzene With Methyl Chloride on an  
Alumosilicate Catalyst

S/152/60/000/003/001/003  
B023/B060

$A_1$  - toluene,  $A_2$  - xylenes,  $A_3$  - "coke",  $k_1'$ ,  $k_2''$  - rate constants for the first and the second step, respectively, and  $\nu_1$ ,  $\nu_2$  are stoichiometric coefficients. With a view to substantiating and confirming scheme (1) the authors checked the data of paper (Ref. 2) with the aid of kinetic equations (Ref. 1). The toluene yield was calculated by the following formula:

$$x_{A_1} = \frac{(1-x) - (1-x)^K}{K-1} \quad (2), \text{ where } x \text{ is the conversion}$$

degree of benzene;  $K = \frac{k_2' b_A}{k_1' b_{A_1}}$ ;  $b_{A_1}$ ,  $b_A$  are adsorption co-

efficients of toluene and benzene, respectively;  $x_{A_1}$  is the yield of

toluene referred to benzene. The value of the apparent rate constant for

the first reaction step was found to be  $k_1^* = \frac{k_1' b_A b_B p^2 S_0}{(1 + k + b_A p + b_B p)^2}$ , and

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Reaction Kinetics of the Alkylation of  
Benzene With Methyl Chloride on an  
Alumosilicate Catalyst

S/152/60/000/003/001/003  
B023/B060

that of the second step,  $k_2'' = \frac{k_1' b_A S_0}{b_B}$ , the same denotations holding for  $x$ ,  $K$ ,  $b_A$ ,  $b_B$ , and  $x_{A_1}$  as in (2);  $r$  is the ratio between the mole number of methyl chloride and the mole number of benzene introduced into the reaction zone in the unit time.  $S_0$  is the area of catalyst per unit of length of the layer in the direction of current. Basing on the dependence of temperature on the apparent rate constants of the alkylation reaction described (Fig. 2), the authors found the values of the apparent activation energies and those of the factors of the Arrhenius equation for the respective reaction steps. For the step of toluene formation from benzene and methyl chloride, the apparent activation energy was  $17400 \pm 400$  cal/mole, and the factor of the Arrhenius equation was  $1000 \cdot 10^4$  mole/cm<sup>3</sup>h. For the second step - formation of xylenes from toluene and methyl chloride - the apparent activation energy was  $12000 \pm 300$  cal/mole, and the factor was  $65$  mole/cm<sup>3</sup>h. In the authors' opinion, the reaction scheme is confirmed by agreement of experimental data with such calculated by equation (2) and

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Reaction Kinetics of the Alkylation of  
Benzene With Methyl Chloride on an  
Alumosilicate Catalyst

S/152/60/000/003/001/003  
B023/B060

(7) with respect to the toluene and xylene yield; agreement of these data with the conversion degree of the initial substances in dependence on the volumetric feeding rate of benzene into the reaction apparatus; linear dependence of the logarithm of the apparent rate constants of the first and the second step of alkylation of benzene with methyl chloride upon

$\frac{1}{T}$ . The ratio K of the apparent rate constant of the first step is larger than unity, because the adsorption coefficient of toluene in the numerator of the formula is larger than the adsorption coefficient of benzene. There are 2 figures and 2 references: 1 Soviet and 1 US. ✓

ASSOCIATION: Moskovskiy institut neftekhimicheskoy i gazovoy promyshlennosti im. akad. I.M. Gubkina (Moscow Institute of Petrochemical and Gas Industry imeni Academician I.M. Gubkin)

SUBMITTED: January 29, 1959

Card 4/4

PANCHENKOV, G.M.; KOLESHNIKOV, I.M.; BUDARINA, Ye.P.

Kinetics of the alkylation of benzene by isopropyl alcohol  
on an aluminosilicate catalyst. Izv.vys.ucheb.zav.; neft' i  
gaz 3 no.6:89-96 '60. (MIRA 13:7)

1. Moskovskiy institut neftekhimicheskoy i gazovoy promy-  
shlennosti im. akad.I.M.Gubkina.  
(Benzene) (Alkylation) (Aluminum silicates)

PANCHENKOV, G.M.; KOLESNIKOV, I.M.

Kinetics of the hydrogenation of unsaturated and aromatic hydrocarbons in a flow. Trudy MINKH1GP no.28:10-25 '60. (MIRA 14:4)  
(Hydrocarbons) (Hydrogenation)

5.1190

2209, 1274, 1153

S/079/60/030/011/024/026  
B001/B055

AUTHORS: Panchenkov, G. M., and Kolesnikov, I. M.

TITLE: Alkylation of Toluene With Propylene Over an Aluminum-silicate Catalyst

PERIODICAL: Zhurnal obshchey khimii, 1960, Vol. 30, No. 11, pp. 3846-3847

TEXT: The authors were able to prepare cymenes in high yields by alkylating toluene in the gaseous state and under atmospheric pressure in a stream of propylene, using an industrial aluminum-silicate catalyst. A special device (Ref. 1) was used for this alkylation. The aluminum-silicate catalyst had the following composition: 14.01  $\text{Al}_2\text{O}_3$ , 84.66  $\text{SiO}_2$ , 0.36  $\text{Na}_2\text{O}$ , 0.13  $\text{Fe}_2\text{O}_3$ , and 0.60  $\text{CaO}$ , and traces of zinc and  $\text{MgO}$ . The toluene was chemically pure. Propylene was prepared by dehydration of isopropyl alcohol over aluminum oxide at  $380^\circ\text{C}$ . At  $300^\circ\text{C}$ , a molar ratio of toluene: propylene of 3 : 1 and an addition rate of 0.45 volumes of toluene per hour with respect to the catalyst volume, the authors obtained cymenes in 77% yield.

Card 1/2

86512

Alkylation of Toluene With Propylene Over an Aluminum-silicate Catalyst S/079/60/030/011/024/026  
B001/B055

calculated for the total initial propylene, while trialkyl benzene yields did not exceed 2.5%. There is 1 Soviet reference.

ASSOCIATION: Moskovskiy institut neftekhimicheskoy i gazovoy promyshlennosti imeni I. M. Gubkina (Moscow Institute of the Petrochemical and Gas Industry im. I. M. Gubkin)

SUBMITTED: June 9, 1960

Card 2/2

PANCHENKOV, G.M.; KOLESNIKOV, I.M.

Alkylation of isopropylbenzene by propylene in the presence of an  
aluminosilicate catalyst. Zhur. prikl. khim. 33 no.6:1425-1427 Je  
'60. (MIRA 13:8)

1. Moskovskiy institut neftekhimicheskoy i gazovoy promyshlennosti  
im. I.M.Gubkina.

(Benzene)

(Propene)

(Alkylation)

KOLESHNIKOV, I.M. (Moscow)

Method of determining ratios of rate constants in bimolecular  
irreversible consecutive reactions. Zhur.fiz.khim. 34 no.5:  
1069-1071 My 60. (MIRA 13:7)  
(Chemical reaction, Rate of)



S/076/60/034/007/022/042/XX  
B004/B068

AUTHOR: Kolesnikov, I. M.

TITLE: Derivation of an Equation for the Kinetics of Hydrogenation of Benzene by Hydrogen in the Presence of Palladium Catalysts

PERIODICAL: Zhurnal fizicheskoy khimii, 1960, Vol. 34, No. 7, pp. 1528-1533

TEXT: The aim of this work was to derive an equation for the kinetics of hydrogenation of benzene by hydrogen in the presence of a palladium catalyst, in a flow system based on experimental data published in a paper by A. V. Frost and others (Ref. 5). According to the theory of G. M. Panchenkov, the relation  $w = n_1 dx / S_0 dl$  is written for the heterogeneous catalytic reaction ( $w$  = reaction rate,  $n_1$  = number of gram-molecules of the initial substance entering the reaction vessel;  $S_0$  = surface of the catalyst per unit length in the direction of flow;  $x$  = conversion degree;  $dl$  = length element of the reaction zone). For the hydrogenation

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Derivation of an Equation for the Kinetics of Hydrogenation of Benzene by Hydrogen in the Presence of Palladium Catalysts S/076/60/034/007/022/042/XX B004/B068

of  $C_6H_6$ , the relation  $A + \nu B \xrightarrow{k'} C$  (3) is assumed to hold; A is  $C_6H_6$ ; B is  $H_2$ ; C is  $C_6H_{12}$ ;  $k'$  is the rate constant of the reaction; and  $\nu$  is the stoichiometric coefficient. If, moreover,  $b_A$ ,  $b_B$ , and  $b_C$  are the adsorption coefficients,  $p_A$ ,  $p_B$ , and  $p_C$  the partial pressures of A, B, and C, respectively, one obtains:  $n_1 dx / S_0 dl = k' b_A b_B p_A p_B / (1 + b_A p_A + b_B p_B + b_C p_C)^2$  (5). If it is supposed that  $n_1$  gram-molecules of A and  $n_2$  gram-molecules of B enter the vessel, then, in a cross section of the vessel corresponding to the conversion degree  $x$  at a distance  $l$  from the start of the reaction zone, the following quantities of reaction components are present: A:  $n_1(1 - x)$ ; B:  $n_1(\gamma - \nu x)$ ; C:  $n_1 x$ , with  $\gamma = n_2/n_1$  (6). The total number of molecules in this cross section is  $\sum n = n_1(1 + \gamma - \nu x)$  (7). Moreover, the Dalton law is valid here:  $p_A / P = n_1 / \sum n$  (8);  $P$  = total pressure.

Substituting (6) and (7) in (8), and (8) in (5), one obtains:

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Derivation of an Equation for the Kinetics  
of Hydrogenation of Benzene by Hydrogen in  
the Presence of Palladium Catalysts

S/076/60/034/007/022/042/XX  
B004/B068

$$n_1 dx / S_0 dl = [k_1 b_A b_B P^2 (1-x)(\gamma - \nu x)] / [1 + \gamma + b_A P + b_B P \gamma - (\nu + b_A P + b_B \nu P - b_C P)x]^2 \quad (9).$$

When  $\beta = (\nu + b_A P + b_B \nu P - b_C P) / (1 + \gamma + b_A P + b_B P \gamma)$  (9a)

and  $k_1 = k_1' b_A b_B P^2 S_0 / (1 + \gamma + b_A P + b_B P \gamma)^2$  (9b) are substituted, one finds:

$$n_1 dx / dl = k_1 (1-x)(\gamma - \nu x) / (1 - \beta x)^2 \quad (10) \text{ and, after integration,}$$

$$\beta^2 x + \nu (\beta - 1)^2 / (\gamma - \nu) \ln(1-x) + [(\beta \gamma - \nu)^2 / (\gamma - \nu)] \ln[(\gamma - \nu x) / \gamma] = k_1 \nu / n_1 \quad (11).$$

From the experimental data, it is concluded that much more  $C_6H_6$  than  $H_2$  is adsorbed on the catalyst in accordance with the inequality:

$\nu + b_A \nu P - b_C P \ll b_A P \gg 1 + \gamma + b_B P \gamma$ , and thus, one obtains  $\beta = 1$ ;

$k_3 = k_1' b_B S_0 / b_A$ , from which results:  $x / \nu + [(\gamma - \nu) / \nu^2] \ln[(\gamma - \nu x) / \gamma] = k_3 / n_1$

(13), and for  $\gamma = \nu$ :  $x / \nu = k_3 / n_1$  (13<sub>1</sub>). Equations (13) and (13<sub>1</sub>) showed a satisfactory stability of the apparent rate constants for the hydrogenation

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Derivation of an Equation for the Kinetics  
of Hydrogenation of Benzene by Hydrogen in  
the Presence of Palladium Catalysts

S/076/60/034/007/022/042/XX  
B004/B068

of  $C_6H_6$  on catalysts containing the following percentage by weight of  
palladium on silica gel: catalyst 1: 1.41; catalyst 2: 1.03; catalyst 3:  
0.49; catalyst 4: 0.18. The calculated values of  $k_2$  (mmole/cm<sup>3</sup>·h) were:  
fresh catalyst 1: about 2.5 (here, it is reported that the calculation  
was inaccurate); fresh catalyst 2: 0.535; "exhausted" catalyst 2: 0.361;  
fresh catalyst 3: 0.223; "exhausted" catalyst 3: 0.105; fresh catalyst 4:  
0.294. From the values found for  $k_2$ , it is evident that the "exhaustabili-  
ty" of the catalyst increases with decreasing Pd content. It was shown by  
the results obtained that a homogeneous palladium surface can be supposed  
when  $C_6H_6$  is hydrogenated with  $H_2$ . There are 4 tables and 8 Soviet  
references.

ASSOCIATION: Moskovskiy institut neftekhimicheskoy i gazovoy promyshlen-  
nosti im. I. M. Gubkina (Moscow Institute of Petrochemical  
and Gas Industry imeni I. M. Gubkin)

SUBMITTED: October 8, 1958

Card 4/4

KOLESNIKOV, I.M.; PANCHENKOV, G.M.

Derivation of a kinetic equation for gas phase reaction of the type  
 $2A - 2A_1 - A_2$ , proceeding in a flow under homogeneous conditions.  
Kin. 1 kat. 2 no.1:9-13 Ja-F '61. (MIRA 14:3)

1. Moskovskiy institut neftekhimicheskoy i gazovoy promyshlennosti  
imeni I.M. Gubkina.

(Chemical reaction, Rate of)

S/081/61/000/020/074/089  
B106/B147

AUTHORS: Panchenkov, G. M., Kolesnikov, I. M.

TITLE: Reaction kinetics of the alkylation of benzene with propylene in the presence of an aluminosilicate catalyst

PERIODICAL: Referativnyy zhurnal. Khimiya, no. 20, 1961, 320, abstract 20L41 ([Tr.] Groznensk. neft. in-t, sb. 23, 1960, 106-120)

TEXT: The alkylation reaction of  $C_6H_6$  with propylene in the presence of an aluminosilicate catalyst at 260-345° and atmospheric pressure was studied. The kinetic equation for the bimolecular irreversible consecutive reaction was derived. On the basis of this equation, the values of the apparent rate constants were found for the stages of isopropyl benzene and diisopropyl benzene formation. From the temperature dependence of the apparent rate constants of the first and second reaction stages the values of the apparent activation energies were found to be 14,300 and 12,600 cal/mole, respectively. There are 27 references. [Abstracter's note: Complete translation.]

Card 1/1

S/065/62/000/009/001/002  
E075/E436

AUTHORS: Kolesnikov, I.M., Panchenkov, G.M., Orlova, A.A.

TITLE: The kinetics of the alkylation reaction of toluene with propylene using alumino-silicate catalyst

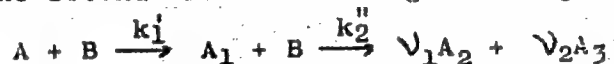
PERIODICAL: Khimiya i tekhnologiya topliv i masel, no.9, 1962, 1-8

TEXT: As the reaction was considered to be suitable for the preparation of chemically pure cymenes, its kinetics were investigated in a flow system at atmospheric pressure. Thermodynamic calculations have shown that at the molar ratio of toluene to propylene of 3:1, the alkylation should be carried out at a temperature not greater than 260°C. The composition of the catalyst was: (%) Al<sub>2</sub>O<sub>3</sub> - 14.01; SiO<sub>2</sub> - 84.66; NaO - 0.36; Fe<sub>2</sub>O<sub>3</sub> - 0.13; Zn and MgO - traces. It was regenerated by air at 550°C. The rate of feed of toluene into the reactor was from 0.4 to 1.8 x 10<sup>-2</sup> mole per 1 cc catalyst/hour. It was shown that for all the reaction temperatures investigated (180, 200, 220, 240 and 260°C) the yields of products decreased with the increasing rate of toluene feed into the reactor. The conversion of propylene exceeded that of toluene, as a result its conversion into Card 1/2

S/065/62/000/009/001/002  
E075/E436

The kinetics of the alkylation ...

cymenes, diisopropyltoluenes and coke. The yield of cymenes increased with temperature and reached a maximum (73% of gram moles of propylene or 24.3% of toluene taken for the reaction) at 240°C. On the basis of results obtained and thermodynamic calculations, the process was described by an irreversible parallel-consecutive reaction of the second order occurring in the gaseous phase



where A - toluene; B - propylene; A<sub>1</sub> - cymenes; A<sub>2</sub> - diisopropyltoluenes; A<sub>3</sub> - coke;  $\nu_1$  and  $\nu_2$  - stoichiometric coefficients;  $k_1'$ ,  $k_2''$  - reaction rate constants for the first and second reaction stages. The reaction rate constants  $k_1$  and  $k_2$  and their ratio  $K = k_2/k_1$  were calculated. The apparent energy of activation for the first stage was found to be 9.5 kcal/mole and the second stage 6.7 kcal/mole. The pre-exponential factors in the Arrhenius equation were 39.8 mole/cm<sup>3</sup> and 3.8 mole/cm<sup>3</sup> for the first and second reaction stages respectively. There are 4 figures and 3 tables.  
ASSOCIATIONS: MINKh and GP im. Gubkina  
Card 2/2



PANCHENKOV, G.M.; KOLESNIKOV, I.M.; KOLESNIKOV, G.M.

Thermodynamic calculations of the realkylation reaction of benzene with diisopropyl-benzene in the gas phase. Trudy MINKHIGP no.37:24-29 '62.

Studying the kinetics of the realkylation reaction of benzene with diisopropyl-benzenes in the presence of an aluminosilicate catalyst. Ibid.:29-38 '62.

Kinetics of the reaction of benzene realkylation with diisopropyl-benzenes on aluminosilicate catalyst. Ibid.:39-51

Thermodynamic calculation of the dealkylation reaction of diisopropyl-benzenes in the gas phase. Ibid.:56-62

Kinetics of the dealkylation of diisopropyl-benzene in the presence of an aluminosilicate catalyst. Ibid.:63-76

Kinetics of coking on an aluminosilicate catalyst in the dealkylation of diisopropyl-benzenes. Ibid.:77-79 (MIRA 17:3)

KOLESNIKOV, I.M.; PANCHENKOV, G.M.

Formation of meta-substituted benzenes in the alkylation of aromatic hydrocarbons with unsaturated hydrocarbons. Neftekhimia 2 no.1:48-53 Ja-F '62. (MIRA 15:5)

1. Moskovskiy ordena Trudovogo Krasnogo Znameni Institut neftekhimicheskoy i gazovoy promyshlennosti im. akad. I.M. Gubkina.

(Benzene derivatives) (Alkylation)

PANCHENKOV, G. M.; KOLESNIKOV, I. M.

Kinetic methods for calculating the dehydrogenation processes  
of hydrocarbons. Neftekhimia 2 no.4:480-486 J1-Ag '62.  
(MIRA 15:10)

1. Moskovskiy institut neftekhimicheskoy i gazovoy promysh-  
lennosti imeni I. M. Gubkina.

(Hydrocarbons) (Dehydrogenation)

FEYZAKHANOV, F.A.; PANCHENKOV, G.M.; KOLESNIKOV, I.M.

Kinetic equations of heptane reactions under the conditions of  
catalytic reforming. Neftekhimiia 2 no.5:716-722 S-0 '62.  
(MIRA 16:1)

1. Moskovskiy institut neftekhimicheskoy i gazovoy promyshlennosti  
imeni I.M.Gubkina.

(Heptane) (Cracking process)

KOLESNIKOV, I.M.

Thermodynamics and kinetics of diethyl ether dehydration on  
aluminum oxide. Neftekhimiya 2 no.5:739-743 S-O '62. (MIRA 16:1)

1. Moskovskiy institut neftekhimicheskoy i gazovoy promyshlennosti  
imeni Gubkina.  
(Ethyl ether) (Dehydration (Chemistry))

PANCHENKOV, G.M.; KOLESNIKOV, I.M.

Catalytic activity of a mixed platinum-palladium catalyst. Izv.  
vys.ucheb.zav.; nef't' i gaz 5 no.8:75-77 '62. (MIRA 17:3)

1. Moskovskiy institut neftekhimicheskoy i gazovoy promyshlennosti.  
im. akademika I.M.Gubkina.

KOLESNIKOV, I.M.; PANCHENKOV, G.M.

Kinetic equation of parallel bimolecular reactions taking place in the gas phase of flow in the presence of solid catalysts. Izv. vys. ucheb. zav.; nef't' i gaz 5 no.10:61-66 '62.  
(MIRA 17:8)

1. Moskovskiy institut neftekhimicheskoy i gazovoy promyshlennosti imeni akademika Gubkina.





PANCHENKOV, G.M.; KOLESNIKOV, I.M.; KOLESNIKOV, G.M.; TSAGAANKHUU, B.

Kinetics of reducing the activity of an aluminosilicate catalyst.  
Trudy MINKHIGP no.37:80-85 '62. (MIRA 17:3)

KOLESNIKOV, I.M.

BARANOV, V.YA., KOLESNIKOV, I.M., ZHOROV, YU.M.,

Kinetics of chemical processes in oil refining and petrochemistry in flow-type reactors

Report to be submitted for the Sixth World Petroleum Congress, Frankfurt, 16-26 June 63

KOLESNIKOV, I.M.

Method of calculating chemical reactions proceeding in a flow under  
nonisothermal conditions. Zhur.fiz.khim. 37 no.10:2283-2284 0 '63.  
(MIRA 17:2)

1. Moskovskiy institut neftekhimicheskoy i gazovoy promyshlennosti.

KOLESNIKOV, I.M.; PANCHENKOV, G.M.; MOROZOV, Ye.A.; ANISIMOVA, N.N.

Kinetics of the alkylation of benzene with ethylene using an aluminosilicate catalyst in the gas phase with the addition of gaseous hydrogen chloride. Izv.vys.ucheb.zav.; neft' i gaz 6 no.11:85-90 '63.  
(MIRA 17:9)

1. Moskovskiy institut neftekhimicheskoy i gazovoy promyshlennosti im.akademika I.M.Gubkina.

KOLESNIKOV, I.M.; PANCHENKOV, G.M.

Calculation of the kinetic constants of processes occurring in  
the gas phase in a flow. Zhur. fiz. khim. 37 no.12:2698-2705  
D '63. (MIRA 17:1)

1. Moskovskiy gosudarstvennyy universitet imeni Lomonosova.

KOLESNIKOV, I.M.; PANCHENKOV, G.M.

Kinetics of ethyl alcohol dehydration in the gas phase in a flow.  
Kinetic equations. Zhur. fiz. khim. 38 no.1:96-101 Ja'64.

(MIRA 17:2)

1. Moskovskiy gosudarstvennyy universitet imeni Lomonosova.

KOLESNIKOV, I.M.

Kinetics of catalytic reactions in the liquid phase when a substance is continuously and regularly added to the system.  
Zhur. fiz. khim. 38 no.3:732-736 Mr '64. (MIRA 17:7)

1. Moskovskiy institut neftekhimicheskoy i gazovoy promyshlennosti imeni I.M. Gubkina.

KOLESNIKOV, I. M.; MIRGALEYEV, I. G.; PAUSHKIN, Ya. M.

Kinetics of the gas-liquid alkylation of benzol by propylene and  
butylene. Khim prom no. 3:174-179 Mr '64. (MIRA 7:5)



BABIN, Ye.P.; MARCHUPA, V.P.; MOISENKO, I.M.

Thermodynamics of the isomerization of certain dialkylbenzenes.  
Neftekhimiya 4 no.2:236-240 Mr-Apr'64 (MIRA 17:8)

1. Institut organicheskoy khimii AN UkrSSR, Donatskoye otdeleniye i Moskovskiy institut neftekhimicheskoy i gazovoy promyshlennosti imeni I.M. Gubkina.

EWI(m)/EPF(c)/T Pr: WE/RU  
 NR: AP4048359

S/0152/64/000/009/0069/0071

Fayzkhanov, F. A.; Panchenkov, G. M.; Kolesnikov, I. M.

Kinetics of the hydrogenolysis of thiophenes and sulfides during reforming.

Neft' i gaz, no. 9, 1964, 69-71

hydrogenolysis, thiophene, sulfide, catalytic reforming, sulfur, thiophene, mercaptan, octane number

ABSTRACT: The octane number and corrosiveness of fuels are influenced considerably by sulfur compounds which they contain. One of the methods for reforming of sulfur compounds is the reforming of the petroleum hydrocarbon fraction of 2-butylthiophene in a flow-type apparatus under a pressure of 10-15 atm (10-15 dyne/cm<sup>2</sup>) at a molar ratio of hydrogen to thiophene  $\gamma_1 = 1000$  and a molar ratio of n-heptane to thiophene  $\gamma_2 = 200$  are given. The molar rate of flow of reagents into the reactor varied from 12 to 25 moles/m<sup>3</sup>/g of catalyst. The experimental data are tabulated. It was found that at the same temperature, an increase in the molar feeding rate of the reagents caused the degree of hydrogenolysis of 2-butyl thiophene to de-

REF: AP4048359

With increasing temperature, under otherwise equal conditions, the conversion increased. The reactions of hydrogenolysis are given with calculation. The experimental kinetic data obtained on the basis of the derived equation are tabulated. The apparent activation energy was 25.5 kcal/mole. By the formula given, the degree of conversion of toluene was calculated at different feeding rate and temperatures. The calculated and experimental values agreed well. For toluene highly diluted with hydrogen, the reaction of hydrogenolysis is of the first order.

has: 2 tables and 6 formulas.

From: Moskovskiy Institut neftekhimicheskoy i gazovoy promyshlennosti  
M. Gubkina (Moscow Institute of the Petrochemical and Gas Industry)

06Apr64

ENCL: 00

SHR ODE: FP, OC

001

OTHER: 000

KOLESNIKOV, I.M.; MIRGALYEV, I.G.; FANSHKIN, Ya.M.

Kinetics of the liquid-phase alkylation of benzene with  
1-hexene. Zhur. fiz. khim. 38 no.6:1442-1449 1962.

Comparison of the efficiency of some catalysts in the  
alkylation of benzene and toluene with 1-hexene. Ibid.:  
1450-1457

(MIRA 18:3)

1. Moskovskiy institut neftekhimicheskoy i gazovoy promyshlen-  
nosti imeni Gubkina.

FEYZKHANOV, F.A.; PANCHENKOV, G.M.; KOLESNIKOV, I.M.

Kinetic equations of the reactions of n-heptane in catalytic reforming.  
Neftekhimiia 4 no.5:722-726 S-O '64. (MIRA 18:1)

1. Moskovskiy institut neftekhimicheskoy i gazovoy promyshlennosti  
imani I.M.Gubkina.

ZETKIN, V.I.; ZAKHAROV, Ye.V.; KOLESNIKOV, I.M.; PANCHENKOV, G.M.

Destructive high-temperature chlorination of nitrobenzene and  
some of the its derivatives. Zhur. fiz. khim. 39 no.5:1240-  
1242 My '65. (MIRA 18:8)

1. Moskovskiy institut neftekhimicheskoy i gazovoy promyshlennosti  
imeni I.M. Gubkina.

FEYZEKHANOV, F.A.; PANCHENKOV, G.M.; KOLESNIKOV, I.M.

Kinetics of hydrogenolysis of thiophenes and sulfides under  
conditions of catalytic reforming. Zhur.fiz.khim. 39 no.7:1647-  
1652 JI '65.

(MIRA 18:8)

1. Moskovskiy institut neftekhimicheskoy i gazovoy promyshlennosti  
imeni I.M.Gubkina.

MARSHTUPA, V.P.; BABIN, Ye.P.; KOLESNIKOV, I.M.; MARYSHKINA, L.I.;  
BORODINA, Z.S.

Solubility of propylene in aromatic hydrocarbons. Khim. prom.  
41 no.8:585-587 Ag '65. (MIRA 18:9)

1. Moskovskiy institut neftekhimicheskoy i gazovoy promysh-  
lennosti imeni akademika Gubkina.



KOLMANSEV, I.M.; PANCHENKOV, G.M.; TOLUPOV, V.S.

Mechanism underlying the action of aluminosilicate catalysts.  
Zhur. fiz. khim. 39 no.3:1369-1374 Ag '65. (NIRA 18:9)

1. Moskovskiy institut neftekhimicheskoy i gazovoy promyshlennosti  
imeni akademika Gubkina i Vsesoyuznyy nauchnyy mashinostroitel'nyy  
institut.

KOLESNIKOV, I.M.; MIRGALEV, I.G.; PAUSHKIN, Ya.M.

Regularities of the liquid phase alkylation of benzene with cyclohexene. Zhur. fiz. khim. 39 no.6:1458-1463 Ja '65.

(MIRA 18:11)

1. Moskovskiy institut neftekhimicheskoy i gazovoy promyshlennosti imeni Gubkina. Submitted April 30, 1964.

PANCHENKOV, G.M.; SAMIGULLIN, M.Sh.; KOLESNIKOV, I.M.; DOROKHIN, V.P.

Isomerization of  $\alpha$ -ethylnaphthalene to  $\beta$ -ethylnaphthalene  
over a synthetic aluminosilicate catalyst. Zhur.fiz.khim. 39  
no.10:2614-2617 0 '65. (MIRA 18:12)

1. Moskovskiy institut neftekhimicheskoy i gazovoy promyshlennosti imeni Gubkina. Submitted February 27, 1965.

L 36444-66 EWP(j)/EWT(m) RM/JW

ACC NR: AP6018073

(A)

SOURCE CODE: UR/0076/66/040/005/1121/1125

AUTHOR: Zetkin, V. I.; Panchenkov, G. M.; Kolesnikov, I. M.; Zakharov, Ye. V.; Kupriyanov, I. I.

29  
B

ORG: Moscow Institute of the Petrochemical and Gas Industry im. I. M. Gubkin  
(Moskovskiy institut neftekhimicheskoy i gazovoy promyshlennosti)

TITLE: Reactivity of nitrobenzene<sup>1</sup> and its chlorine derivatives. 1. Investigation of high temperature destructive chlorination

SOURCE: Zhurnal fizicheskoy khimii, v. 40, no. 5, 1966, 1121-1125

TOPIC TAGS: nitrobenzene, nitrogen compound, chlorinated aromatic compound, chlorinated organic compound

ABSTRACT: Destructive chlorination<sup>1</sup> of nitrobenzene, and ortho-, para-, and methachloronitrobenzenes was studied in the 403°-673°K range in the presence and absence of activated carbon. Glass ampoules containing nitrocompounds with chlorine and carbon were charged at liquid nitrogen temperature, evacuated, and sealed. Subsequently, the ampoules were heated in thermostats for 30 minutes at reaction

Card 1/2

UDC: 541.128